I. Listing of Claims

Please amend the Claims presented below as follows (the changes in these Claims are shown with strikethroughs for deleted matter and underlining for added matter):

1. (Currently Amended) Connection system for conduits, fittings or assemblies which are intended for carrying a fluid acted upon by a pressure ~~(p_1)~~ increased with respect to a reference pressure ~~(p_2)~~, in particular for systems carrying carbon dioxide, comprising a first coupling part ~~(1)~~, such as a housing part, a second coupling part ~~(2)~~, such as a plug part, capable of being introduced into the first coupling part ~~(1)~~ along an axis ~~(X-X)~~, and at least one gas-permeable circumferential seal ~~(3)~~ which consists of an elastomer and is arranged in a groove ~~(4)~~ which has a groove depth ~~(T)~~ and a groove length ~~(NL)~~ and which is formed circumferentially in one of the ~~two~~ first and second coupling parts ~~(1, 2)~~, ~~one~~ the second coupling part ~~(2)~~ being capable of being plugged with a shank ~~(5)~~ into a round receiving orifice ~~(6)~~ of the ~~other~~ first coupling part ~~(1)~~, after plugging-in, the circumferential seal ~~(3)~~, while undergoing deformation and generating a radial prepressing force ~~(F_V)~~, sealing off a gap ~~(7)~~ with a gap width ~~(s)~~ between the outer radius ~~(R_{SA})~~ of the shank ~~(5)~~ and the inner radius ~~(R_{OI})~~ of the receiving orifice ~~(6)~~ and at the same time bearing against the first and second coupling parts ~~(1, 2)~~ at least over a contact length ~~(KL)~~ running in the axial direction ~~(X-X)~~ perpendicularly to the ~~respective~~ inner and outer radius ~~(R_{SA}, R_{OI})~~ of the first and second coupling parts ~~(1, 2)~~, ~~characterized in that~~ wherein the cross section ~~(AU, AU_R, AU_E, AU_{opt})~~ of the nonpressed circumferential seal ~~(3)~~, the groove depth ~~(T)~~ and the gap width ~~(s)~~ and ~~also~~ the groove length ~~(NL)~~ are coordinated with one another in such a way that, ~~in~~ a ratio ~~(A_E/KL)~~, ~~determining a~~

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~~permeation through the circumferential seal (3)~~, of a permeation-active partial circumferential area ~~(A_E)~~ of the circumferential seal ~~(3)~~ to the contact length ~~(KL)~~ that determines a permeation through the circumferential seal, the partial circumferential area ~~(A_E)~~ is no greater than half the value of a cross-sectional area ~~(A_V)~~ of the deformed circumferential seal ~~(3)~~, the said cross-sectional area running perpendicularly to the axial direction ~~(X-X)~~.

2. (Currently Amended) Connection system according to Claim 1, ~~characterized in that~~ wherein the cross section ~~(AU, AU_R, AU_E, AU_{opt})~~ of the nonpressed circumferential seal ~~(3)~~, the groove depth ~~(T)~~, ~~and~~ the gap width ~~(s)~~ and ~~also~~ the groove length ~~(NL)~~ are coordinated ~~with one another~~ in such a way that, ~~in~~ the ratio ~~(A_E/KL)~~, ~~determining the permeation through the circumferential seal (3)~~, of the permeation-active partial circumferential area ~~(A_E)~~ of the circumferential seal ~~(3)~~ to the contact length ~~(KL)~~ that determines the permeation through the circumferential seal, the partial circumferential area ~~(A_E)~~ is no greater than one fifth of the value of a cross-sectional area ~~(A_V)~~ of the deformed circumferential seal ~~(3)~~, the said cross-sectional area running perpendicularly to the axial direction ~~(X-X)~~.

3. (Currently Amended) Connection system according to Claim 1 ~~or 2~~, ~~characterized in that~~ wherein the partial circumferential area ~~(A_E)~~ is arranged in the vicinity of the gap ~~(7)~~ and is determined by an arcuate line ~~(BL)~~ of a pressed radial cross-sectional area ~~(A_R)~~ of the deformed circumferential seal ~~(3)~~.

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4. (Currently Amended) Connection system according to Claim 3, ~~characterized in that~~ wherein a length of the arcuate line ~~(BL)~~ assumes minimally the value of the gap width ~~(s)~~ in the case of a disappearing arcuate curvature and at maximum is no greater than half the value, preferably one quarter of the value, of the sum of the gap width ~~(s)~~ and of the groove depth ~~(T)~~.

5. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 4~~, ~~characterized in that~~ wherein the cross section ~~(AU, AU_R, AU_E, AU_{opt})~~ of the nonpressed circumferential seal ~~(3)~~, the groove depth, ~~(T) and~~ the gap width, ~~(s)~~ and ~~also~~ the groove length ~~(NL)~~ are coordinated ~~with one another~~ in such a way that the permeation-active partial circumferential area ~~(A_E)~~ is independent of a cord thickness ~~($2*R_{SO}$, $2*HB$)~~ of the nonpressed circumferential seal ~~(3)~~.

6. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 5~~, ~~characterized in that~~ wherein the size of a contact length ~~(KL_1)~~ between the inner radius ~~(R_{OI})~~ of the first coupling part ~~(1)~~ and the circumferential seal ~~(3)~~ is dimensioned according to the equation

$$KL_1 = C1\sqrt{\frac{F_V R_{RS}}{E_D R_{OI}}}$$

C1 being a constant, F_V being the prestressing force acting in the radial direction, R_{OI} being the inner radius of the first coupling part ~~(1)~~, E_D being the value of the modulus of elasticity of the circumferential seal ~~(3)~~, and R_{RS} being a measure of the convex

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curvature of the seal ~~(3)~~, for example the cord radius ~~(R_{SO})~~ of an O-ring seal ~~(OR)~~ in a nonpressed state.

7. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 6~~, ~~characterized in that~~ wherein a degree of filling ~~(FG)~~ of the groove ~~(4)~~, calculated, taking into account the possible thermal expansion of the circumferential seal ~~(3)~~, as a quotient of a fraction, lying in the groove ~~(4)~~, of the pressed radial cross section ~~(A_R)~~ of the circumferential seal ~~(3)~~ and the cross-sectional area ~~(A_N)~~ of the groove ~~(4)~~, lies in the range of 58.0 percent to 100.0 percent~~, preferably of 78.0 percent to 98.0 percent~~.

8. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 7~~, ~~characterized in that,~~ wherein in the case of an asymmetric position of the circumferential seal ~~(3)~~ in the groove ~~(4)~~, taking into account the possible thermal expansion of the circumferential seal ~~(3)~~, a degree of filling ~~(FGH)~~ of the groove ~~(4)~~, calculated as a quotient of a comparatively larger fraction ~~(A_{RH})~~, lying in one half of the cross-sectional area ~~(A_N)~~ of the groove ~~(4)~~, of the pressed radial cross section ~~(A_R)~~ of the circumferential seal ~~(3)~~ and of half the cross-sectional area ~~($A_N/2$)~~ of the groove ~~(4)~~, lies in the range of 58.0 percent to 100.0 percent~~, preferably of 78.0 percent to 98.0 percent~~.

9. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 8~~, ~~characterized in that~~ wherein the cross section ~~(AU_E, AU, AU_{opt})~~ of the circumferential seal ~~(3)~~ has, in the nonpressed state, a preform, in which a quotient

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~~(FZ_U)~~ of an axial main extent ~~(HA)~~ and of a radial main extent ~~(HB)~~ of the seal cross section has a value of greater than 1~~, preferably greater than 2~~.

10. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 9~~, ~~characterized in that~~ wherein the cross section ~~(AU_E)~~ of the circumferential seal ~~(3)~~ in the nonpressed state has an elliptic form.

11. (Currently Amended) Connection system according to one of Claims 1 to 9, ~~characterized in that~~ wherein the cross section ~~(AU)~~ of the nonpressed circumferential seal ~~(3)~~ is composed of two semicircular areas ~~(KF1, KF2)~~ or areas in the form of a segment of a circle and ~~of~~ a rectangular area ~~(RF)~~ lying between ~~them~~ the areas.

12. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 9~~, ~~characterized in that~~ wherein the cross section ~~(AU_{opt})~~ of the nonpressed circumferential seal ~~(3) consists in the basic configuration of~~ has a generally ~~rectangle~~ rectangular shaped configuration which has two longitudinal sides curved convexly with a first radius of curvature ~~(R_1)~~, two transverse sides curved convexly with a second radius of curvature ~~(R_2)~~ and four corners rounded convexly with a third radius of curvature ~~(R_3)~~.

13. (Currently Amended) Connection system according to Claim 12, ~~characterized in that~~ wherein the third radius of curvature ~~(R_3)~~ is smaller than the first

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radius of curvature ~~(R_1)~~ and the first radius of curvature ~~(R_1)~~ is smaller than the second radius of curvature ~~(R_2)~~.

14. (Currently Amended) Connection system according to ~~one of Claims~~ Claim1 ~~to 8~~, ~~characterized in that~~ wherein the circumferential seal ~~(3)~~ is formed by an O-ring ~~(OR)~~ with a cross section ~~(AU_R)~~ which is circular in the nonpressed state, in which the ratio of the inside diameter ~~$(R)_1$~~ to the thickness of its cord ~~($2*R_{SO}$)~~ is smaller than or equal to 6, ~~preferably is smaller than 3,~~ and in which a minimum pressing ~~(VP)~~ lies in a range of more than 15 percent~~, preferably of more than 25 percent to a maximum of 40 percent~~.

15. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 14~~, ~~characterized in that, in the radial cross section (A_R) of the deformed circumferential seal (3)~~, wherein the contact length of the radial cross section of the deformed circumferential seal ~~(KL)~~ differs by less than 15 percent, ~~preferably by less than 10 percent, particularly preferably by less than 5 percent,~~ from a maximum axial permeation length ~~(L_{max})~~ through the circumferential seal ~~(3)~~.

16. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 15~~, ~~characterized in that~~ wherein the first coupling part ~~(1) and/~~or the second coupling part ~~(2)~~ consists of metallic materials~~, in particular of aluminum alloys or highly alloyed high-grade steel alloys~~.

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17. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 16~~, ~~characterized in that~~ wherein a maximum roughness value ~~(R_{max})~~ of the surfaces of the coupling parts ~~(1, 2)~~, at least in the region of the outer radius ~~(R_{SA})~~ of the shank ~~(5)~~ and of the inner radius ~~(R_{OI})~~ of the receiving orifice ~~(6)~~, where the circumferential seal ~~(3)~~ comes to bear, is lower than 16 µm~~, preferably lower than 10 µm~~.

18. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 17~~, ~~characterized in that~~ wherein the surfaces of the coupling parts ~~(1, 2)~~, at least in the region of the outer radius ~~(R_{SA})~~ of the shank ~~(5)~~ and of the inner radius ~~(R_{OI})~~ of the receiving orifice ~~(6)~~, where the circumferential seal ~~(3)~~ comes to bear, are produced by the smooth rolling of faces which, as compared with the machined surfaces, have an over dimension of 0.018 mm to 0.040 mm and a roughness ~~(R_a)~~ in the range of 1.6 to 3.2 µm.

19. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 18~~, ~~characterized in that~~ wherein the circumferential seal ~~(3) consists of~~ includes a polymeric fluorocarbon compound, of synthetic rubber~~, such as silicone rubber, NBR or H-NBR, PUR, EPDM, SBR, or the like~~.

20. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 19~~, ~~characterized in that~~ wherein the circumferential seal ~~(3)~~ has a Shore A hardness in the range of 70 to 90.

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21. (Currently Amended) Connection system according to ~~one of Claims~~ Claim1 ~~to 20~~, ~~characterized in that~~ wherein two or more circumferential seals ~~(3)~~ are arranged one behind the other in the axial direction ~~(X-X)~~.

22. (Currently Amended) Connection system according to Claim 21, ~~characterized in that~~ wherein an outer circumferential seal ~~(3)~~ accessible to the surrounding atmosphere has~~, due to aging,~~ a reduced permeability coefficient ~~(P)~~ ~~and~~ than an inner circumferential seal ~~(3)~~ protected from the surrounding atmosphere by the outer circumferential seal ~~(3)~~.

23. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 22~~, ~~characterized in that~~ wherein the fluid acted upon by the pressure ~~(p_1, p_2)~~ is carbon dioxide ~~(CO_2)~~.

24. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 23~~, ~~characterized in that~~ wherein the pressure ~~(p_1)~~ acting upon the fluid lies in the range of about 10 bar to 180 bar.

25. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 24~~, ~~characterized in that~~ wherein a value ~~(Q_2)~~ of the quantity ~~(Q)~~ of the fluid which has penetrated through the circumferential seal ~~(3)~~ as a result of permeation is no greater than about 2.5 g per year and connection~~, preferably no greater than 1 g per year and connection~~.

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26. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 25, in particular according to one of Claims 23 to 25~~, ~~characterized in that~~ wherein the ratio ~~(A_E/KL)~~ determining the permeation through the circumferential seal ~~(3)~~ is no greater than 50.0 mm, ~~preferably no greater than 17.5 mm,~~ at room temperature.

27. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 26, in particular according to one of Claims 23 to 26~~, ~~characterized in that~~ wherein the ratio ~~(A_E/KL)~~ determining the permeation through the circumferential seal ~~(3)~~ is no greater than 4.5 mm, ~~preferably no greater than 1.2 mm,~~ at 100°C.

28. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 27, in particular according to one of Claims 23 to 27~~, ~~characterized in that~~ wherein the ratio ~~(A_E/KL)~~ determining the permeation through the circumferential seal ~~(3)~~ is no greater than 1.00 mm, preferably no greater than 0.25 mm at 150°C.

29. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 28~~, ~~characterized in that~~ wherein a plugging force ~~(F_S)~~ which can be applied for plugging-in, while the circumferential seal ~~(3)~~ undergoes deformation and the radial prepressing force ~~(F_V)~~ is generated, is, in the case of an inner radius ~~(R_{OI})~~ of the first coupling part ~~(1)~~ in a range of about 6 mm to 13 mm, lower than 100 N~~,~~ ~~preferably lower than 50 N, particularly preferably lower than 30 N~~.

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30. (Currently Amended) Connection system according to ~~one of Claims~~ Claim 1 ~~to 29~~, ~~characterized in that~~ wherein the circumferential seal ~~(3)~~ is provided with a gas barrier coating.

31. (Cancelled).

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